



Lightning Protection Components
Field Tester

User's Manual KV1101

KOVI TEST EQUIPMENT CO., LTD.

Document No. KV13201306201.01

Attention

High voltage is generated while Lightning Protection Components Field Tester works. For your safety, please read this manual and relative document carefully before operating the tester. Be careful while operating. Keep this manual properly and put it in the place that operator easy to get. Pass this manual to the final user.

〔Design Declaration〕

! DANGER

Touching the test interface or opening the case is forbidden due to the generated high voltage while the Tester works. If changing cable is necessary, please make sure no high voltage output during all the operations.

! WARNING

Operate the Tester properly after read this manual carefully. If problems occur during the test, please check the Tester after power off.

Other Attentions:

- Please power off the Tester when not used to ensure the use life.
- Avoid damp, rain, exposure and falling.
- Storage condition for the Tester: humidity less than 75%RH, no acidity, alkalinity or causticity.
- Make sure the test product and Tester are connected firmly to avoid sparking.

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General Information

- Thank you for purchasing the Lightning Protection Components Field Tester of KOVI TEST
- This manual mainly introduces application of the Lightning Protection Components Field Tester.
- Please read this manual carefully before using the Tester. Operate the Tester properly after get enough comprehension from this manual.
- Please read relative document for the software and hardware introduction.
- Please pass this manual to the final user.

User Instructions

- No teardown when problem occurs. Only professional staff can disassemble the tester, please contact our technical department for support.
- Examples in the manual and other documents are only for the comprehension and reference of the user.
- Please check the standard and principle when the tester is used combined to other products.
- Please check whether meet the requirements and safety issue by yourself when using this tester.
- Testing is forbidden when your hands are wet or the humidity more than 75%RH.
- Please follow this manual for the operation strictly .

Disclaimer

- All the contents in this manual have been checked carefully. Please kindly understand when the operation not accord to the manual. Please contact us on any issue about this manual.
- All the contents will be checked and updated in later version. Your suggestions are welcome.
- If there is any change about contents of the manual, please understand that without notice.

Contact

If you have any question about the use of the tester, please contact KOVI TEST.

- TEL: 0755-86108776 86108775
- FAX: 0755-26039029
- Address: 4th 4/F. Bld. No.4, Block No.2, South Honghualing Industrial Zone, Xili, Nanshan District, Shenzhen
- Zip Code: 518052

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Preface

Thank you for using product of KOVI TEST. This test system has specified appearance design and kinds of strict safety tests. All the parameters of this system are set to optimized value for you to get accurate test

If you have any quality issue of this Tester, please contact our technical department, we will reply you with our best service. Please read this manual carefully before using this test system.

1 Technical Data

1-1. Major Parameters

GDT DCBV	Voltage Range	60-1800V
	Current Range	0. 1-100 μ A/1-1000 μ A (Customized)
	Test Accuracy	$\leq \pm 2\% \pm 1d$
	Voltage Polarity	Automatic Conversion for Positive and Negative Polarity
	Settable Upper and Lower Limit, qualified and unqualified Judgment. (need Test Fixture)	
MOV Test	U0.1mA MOV Voltage Range	60-1800V
	U1mA MOV Voltage Range	60-1800V
	IL Leakage Current 0. 75U1mA	0-100 μ A
	Test Accuracy	U1mA $\leq \pm 2\% \pm 1d$
		IL Leakage Current 0. 75U1mA $\leq \pm 2\mu A \pm 1d$
	Test Condition	U1mA=1mA $\pm 5\mu$ A
		IL Leakage Current 0.75U1mA $\leq \pm 2\% \pm 1d$
	Voltage Polarity	Automatic Conversion for Positive and Negative Polarity
SPD Field Test (Meteorology)	Support Storage of USB Disk	
	Automatic judgment and display for the category of test product	
	Settable upper and lower limit, qualified and unqualified judgment. (Grading function is custom)	
M-SPD	Test mode	1+1 mode, 4 MOV mode, 3+1 mode
	Test conversion fixture is necessary. Switch in 5 wires on triphase, One-phase, common mode or differential mode.	

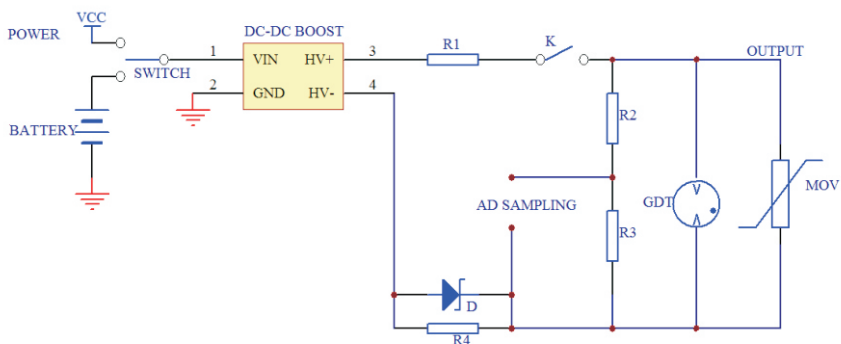
Meteorology	Support data storage function. Transfer data to PC or USB disk
	Support data storage function. Transfer data to PC or USB disk
Data Transfer Software	Transfer test data to PC. Read 3-3 operating introduction for transfer software for reference.

1-2. Major Functions and Features

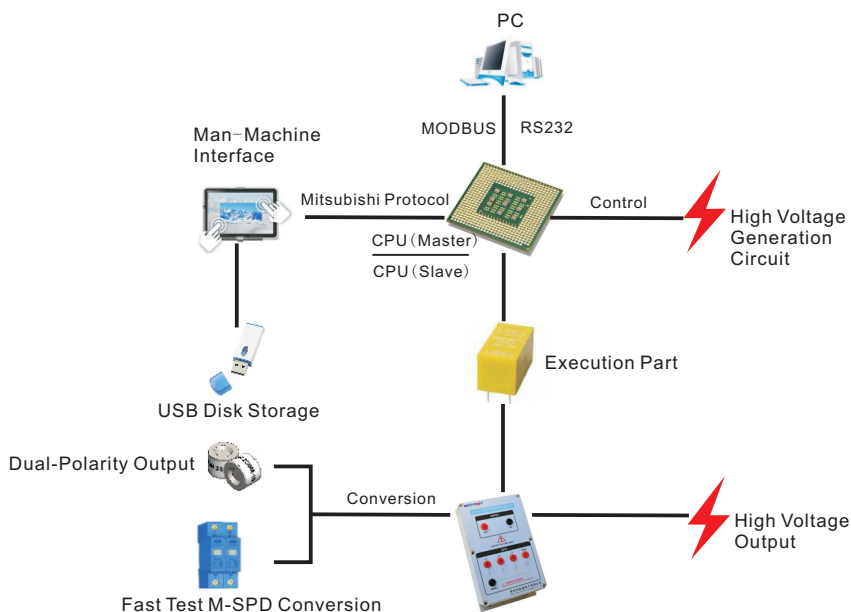
- Operate Simply. One key operation finish testing.
- Support data storage of USB disk in field mode. Generated reports can be opened via Excel or WPS.
- Touch screen operation interface, convenient for man-machine communication. Controlled by 16-bit MCU.
- Support upper and lower limit setting, qualified and unqualified judgment.
- Be compatible for GDT and MOV test.
- Support intelligent judgment of Black Box components for GDT and MOV.
- Support communication with PC. Transfer real time test result to PC and generating report by dedicated software.
- Support communication with inkjet machine and laser printer for convenient production via standard modbus protocol.
- Portable and support inside battery for user operation with endurance for 6 hours.
- Support self-check and self-calibration function with multimeter.
- Support breakdown Voltage(@100V/S) of GDT(GDT, SSA and so on) and Voltage test of MOV
- Support memory, calculation, maintain, control and self-check function.

2 Working Principle

2-1. Working Principle

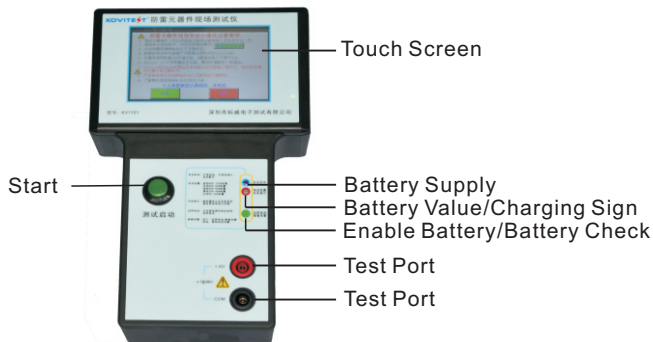


2-2. Working Principle



3 Operating Instructions

3-1. Appearance Introduction



Right View

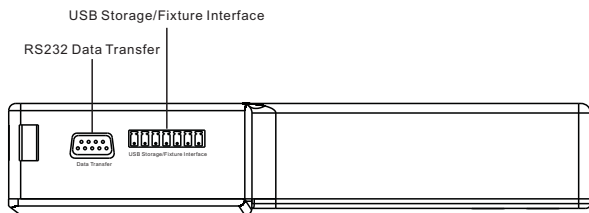


Figure 2

Left View

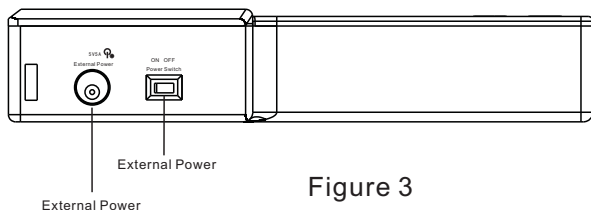


Figure 3

Appearance Introduction

Name	Description
Touch Screen	Display Operation Menu
Start	Press this button to start test after parameters setting
Battery Supply	The battery supply the power when the LED lights. It will automatically cut off when extern power supplies.
Battery Value/ Charging Sign	Different colors show different energy. See the tester for detail.
Enable Battery/ Battery Check	Press this key to show the operation menu of tester when turn on the Power Switch
Test Port	Output test signal, connected to test touch probe.
RS232 Data Transfer	Connected to S232 cable, transfer data to PC.
Fixture Interface	Connected to test fixture
USB Storage	Transfer data to USB disk, only USB disk capacity less than 8GB supported.
External Power	Connected to AC adaptor
Power Switch	Turn On/Off the tester

Configuration

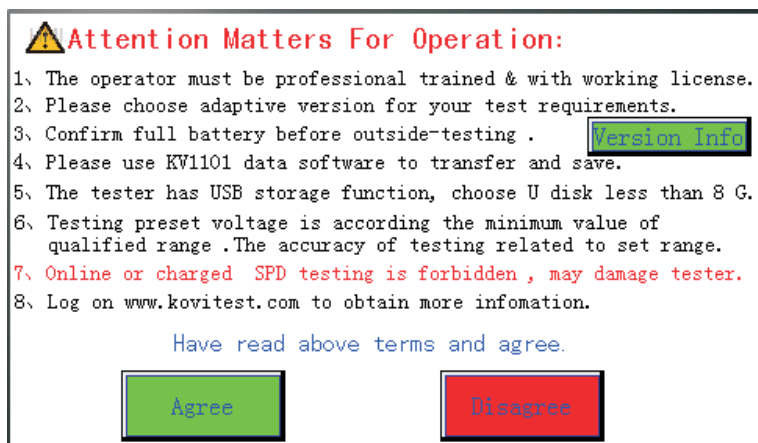
Name	Description
Weight	About 0.96 kg
Dimensions	244. 5mm*152mm*47mm
Aluminum Box	460mm*310mm*110mm
Carton Box	525mm*400mm*165mm
Package Methods	Aluminum Box + Carton Box

3-2. Test Menu Operating Introduction

Turn on power switch, press enable battery button. Enter operation menu, shown as below:



Press any position of the touch screen to enter “Cautions” menu, shown as below:



Select “View Version Information” to enter version information menu, shown as below. Select “Return” to return to “Cautions” menu after check version information.

Version Information									
Model	Version	Record Function					Test Function		
		Software	Data Transfer	save	USB save	Building	GDT	MOV	M-SPD
KV1101-A	Manufac	✓	✓	✗	✗	✗	✓	✓	✓
KV1101-B	Dealer	✓	✓	✗	✓	✗	✓	✗	✓
KV1101-C	Operator	✓	✓	✓	✓	✓	✓	✓	Q

 **Attention** Add SPD module testing function, need purchase KV1101-J test fixture

Back

Select “Agree” in the Cautions menu to enter “Staff Password” menu, shown as below:

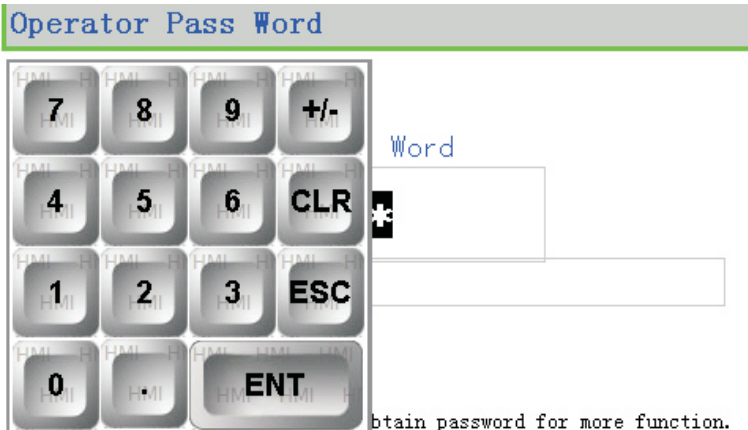
Operator Pass Word

Pass Word

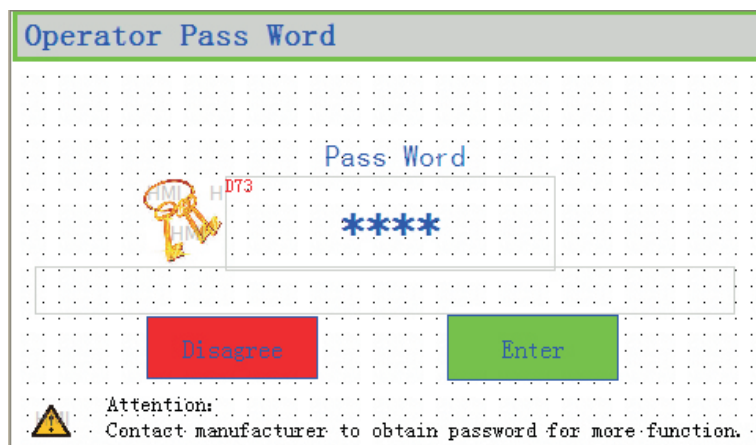


Disagree

 **Attention:**
 Contact manufacturer to obtain password for more function.



Input "1111" in the soft keyboard menu, select "ENT" to the following menu:



Select "Enter" in this menu to enter main menu (Test Select Menu), shown as below:

Choose Testing Menu			
Field Testing	Field Testing (Meteorology)	Fuzz Testing (Unknown)	Building Data (EMC)
Manufac Testing	Single GDT (GDT)	Single MOV (MOV)	M-SPD Module (M-SPD)
Function Menu	Contact Us	Testing Standard (GB21431-2008)	Tester Calibration Current & Voltage

Operation of main menu (Test Select Menu)

Operation of SPD Field Test (Meteorology)

- Set qualified range

Select "Operation of SPD Field Test (Meteorology)" in the "Operation of main menu" to enter "Field Test SPD/Qualified Range" menu, shown as below. The Tester has been initialized before shipment, please select "Complete Setting" directly if the range is fit to the components to test. Otherwise, please set the range by yourself and see the "Qualified range setting method" for reference.

judge/ qualified range setting			Based for
Setting range for upper and lower bound			《GB21431-2008》
IL auto - setting upper bound 20uA			Setting
First (U0)	U0: L-N voltage effective value (L-N, N-PE) (L-PE)	U0 = U _c × 1.15 U0 = U _c × 1.55	Lower Limit
Second (UDC)	conversion DC AC SPD UDC = U0 × 1.414 DC SPD UDC = U0		0 V
Third (Umin)	Figure out lower bound (Enter on setting) AC SPD Umin = UDC × 1.86 DC SPD Umin = UDC × 1.33		Upper Limit
Fourth (Umax)	figure out upper bound (Enter on setting) MOV SPD Umax = Umin × 1.2 GDT SPD Umax = Umin × 1.4		0 V
Fifth (set up)	Please input results then enter "set up" to exit.		Set success
There is no upper require of SPDUImA in GB21431			Set OK

提醒: 220VAC/380VAC (TT) system: lower=220*1.414*1.86=578V, upper=578*1.2=694V
(be up to 1.4 times of lower bound under the condition UP 578*1.4=810V)

Name	Description
Qualified lower limit	Set qualified lower limit. Touch "qualified lower limit" and set the value between 60 and 1800 in the pop up soft keyboard.
Qualified upper limit	Set qualified upper limit. touch "qualified upper limit" and set the value between 60 and 1800 in the pop up soft keyboard.
Complete setting	Select "Complete setting" after setting done, then confirm and save the values. The values are memorized to the Tester.

- Check Data Storage Instruction

The Tester automatically enters "Field Test Result" menu, shown as below:

Field Test Result			Real-time Voltage
Testing Item	Result	Record & Data Storage Data amount1—6000	0
Voltage (V)	0	Recorded 0 Data	Run/Stop Stop
Leakage Current (uA)	0.0		Data Storage State
Result	Sort	Qualified	Range Range Setting
			Back
 Attention! 1. Leakage range less than 20 uA according to GB has been set, please set voltage range. 2. Please choose Manufacture Testing for batch test.			

Select "Data Storage Instruction" in "Field Test Result" menu to enter "Field Test Data Storage" menu, shown as below. Please read the clauses carefully. Select "Return" to return to "Field Test Result" menu.

Filed Testing Data Save

1. Filed testing has no +/- transform and transmission data of real time to PC.
2. Field testing can use USB storage (U disk < 8 g), cannot use the hard disk or bigger mass storage, also cannot connect to computer with USB cable
3. Save data finish a testing cycle, first time because to create a form for a bit long, don't start test button
4. Storage format is (day) (month) (year), Eg: 09082012.CSV. CSV to form a file by date incrementally every day
5. 09082013. CSV file format is compatible with Excel of Microsoft Office software, Use Excel powerful function to do analysis, report, printing, statistics, etc
6. Please use the standard U disk, it's better with data light to observe conveniently.
7. other testing module please use KV1101 software
8. Shut off the tester power first then unload U disk. Pull out U disk is forbidden when tester is working.

 **Back**

Field Test Instructions

Make sure to return to "Field Test Result" menu, insert 4GB USB Disk to the USB interface.

Field Test Result

Testing Item	Result	Record & Data Storage Data amount 1-6000
Voltage (V)	0	Recorded 0 Data
Leakage Current (uA)	0.0	
Result	Sort	Continue Storage
	Qualified	

 **Attention!** 1. Leakage range less than 20 uA according to GB has been set, please set voltage range.
2. Please choose Manufacture Testing for batch test.

Real-time Voltage
0

Run/Stop
Stop

Data Storage
State

Range
Range Setting

Back

- Insert the crocodile clip probes to the test ports, take apart the M-SPD module and clip one of the small modules using crocodile clip.
- Press the green START of the Tester to start test. Test parameters and judgment results will be displayed on the screen when test done.
- When finishing test a batch of M-SPD modules, please pull out the USB Disk after the Tester power off, otherwise the storage data may be in chaos.

- The .csv format file named by data such as “20130701.csv” is automatically generated in the USB Disk, it can be opened by both Excel and WPS.

Steps of Field Test

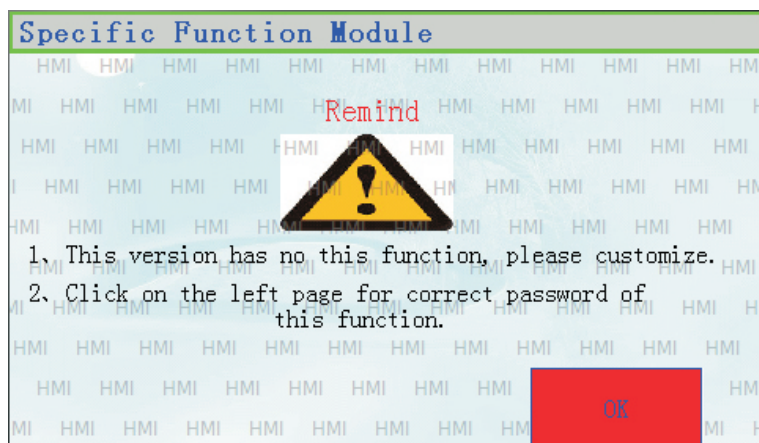
- Select “Fuzzy Test” in the “Test Select Menu” to enter fuzzy test (unknown name components) menu, shown as below:

Fuzz Testing (Unknown Components)		
Testing Item	Testing Result	
Voltage (V)	0	Actual time voltage 0
Leakage Current (uA)	0.0	Run/Stop Stop
 Remind: 1、Fuzzy test, without + / - testing ,without USB storage and data transmission 2、Judge for GDT/MOV of power SPD please use < field testing>module		Back

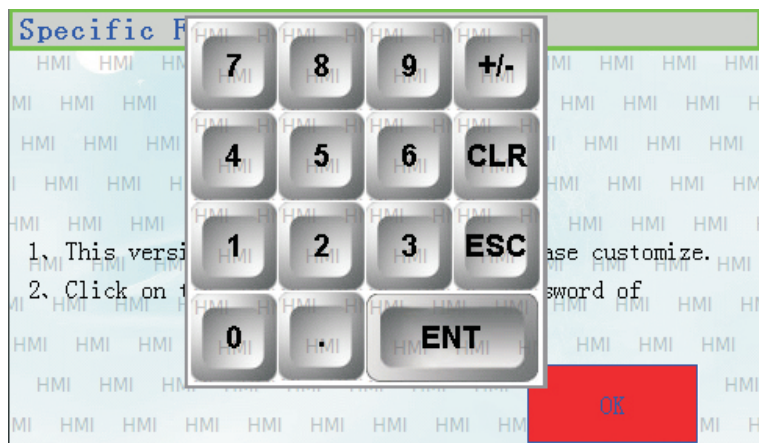
- Insert the crocodile clip probes to the test ports, clip the component using crocodile clip.
- Press the green START of the Tester to start test. Test parameters and judgment results will be displayed on the screen when test done.

Building Data (Electromagnetic Environment)

- Select “Building Data (Electromagnetic Environment)” in the “Test Select Menu” to enter “Special Function Module” menu, shown as below:



- Please contact us on demand to get the password. According to the indication, touch the left bottom of the screen to pop up the soft keyboard, shown as below:



- Use this function after enter password.

Single Discharge Tube Module

- Select "Single Discharge Tube Module" in the "Test Select Menu" to enter Single Discharge Tube Module menu, shown as below:

Single GDT Module				Save Set-state After Setting
Set Par (Range)	Minimum (V)	Maximum (V)	Save Setting	Actual Time Voltage 0 Run/Stop Stop Set sub-file Set sub-file Back Back
	0	0	Save Setting	
record the th data 0 Result save continue	Positive UAE	Negative UEA	Result	
	0 V	0 V		

Attention: U disk storage file name: KV1101G CSV.

- Set Parameters (Qualified Range)

Name	Description
Set Minimum Value	Touch "Mini(V)" and set the value between 60 and 1800 in the pop up soft keyboard.
Set Maximum Value	Touch "Maxi(V)" and set the value between 60 and 1800 in the pop up soft keyboard.
Save Setting	Select "Save Setting" after setting done, then confirm and save the values. The values are memorized to the Tester.

- Scalar Qualified Range Setting

Select "Set Grading" in the single discharge tube module menu to enter discharge tube voltage range automatic grading menu, 4 kinds of qualified condition supported, shown as below:

Auto-step of GDT voltage range		
Step code	Lower Limit	upper Limit
A BOX (OK1)	Auto -qualified minimum	0
B Box (OK2)	Auto-limit Value to A box	0
C Box (OK3)	Auto-limit Value to B box	0
D Box (OK4)	Auto-limit Value to C box	Auto -qualified maximum
E Box (NO OK)	All is less than the minimum and larger than the maximum range.	

Remind: Data logging software use to Statistics and analysis test results.

OK

Upper Limit Setting Instruction

Upper Limit of A box(qualified 1), B box(qualified 2) and C box(qualified 3) can be set in the Discharge tube voltage range automatic grading menu.)

Name	Description
Upper Limit of A box(qualified 1)	Touch the green number of the A box (qualified 1) and set the value in the pop up soft keyboard, the value should be between the qualified minimum value in Single Discharge Tube module menu and 1800.
Upper Limit of B box(qualified 2)	Touch the green number of the B box (qualified 2) and set the value in the pop up soft keyboard, the value should be between Upper Limit of A box(qualified 1) and 1800.
Upper Limit of C box(qualified 3)	Touch the green number of the C box (qualified 3) and set the value in the pop up soft keyboard, the value should be between Upper Limit of B box(qualified 2) and 1800.
Confirm	Select "Save Setting" after setting done, the tester will memory the values and return to Single Discharge Tube Module menu.

• Single Discharge Tube Module Test Instructions.

Single GDT Module				Save Set-state After Setting	
Set Par (Range)	Minimum (V)	Maximum (V)	Save Setting	Actual Time Voltage	0
	0	0	Save Setting	Run/Stop	Stop
record the th data	Positive UAE	Negative UEA	Result	Set sub-file	
Result	0 V	0 V		Back	

Attention: U disk storage file name: KV1101G CSV.

- Make sure to return to "Single Discharge Tube Module" menu, insert 4GB USB Disk to the USB interface.
- Insert the crocodile clip probes to the test ports, clip the Discharge Tube using crocodile clip or probe.
- Press the green START of the Tester to start test. Test parameters and judgment results will be displayed on the screen when test done.
- When finishing test a batch of products, please pull out the USB Disk after the Tester power off, otherwise the storage data may be lost
- The .csv format file named "KV1101G.csv" is automatically generated in the USB Disk, it can be opened by both Excel and WPS.
- Touch "Return" in the left bottom of the screen to return main menu (Test Select Menu) when finishing test.

Single Varistor Module

Select "Single MOV Module" in the "Test Select Menu" to enter Single MOV Module menu, shown as below:

Single MOV Module				Save Set-state After Setting	
Set Par (Range)	U1mA/MIN (V)	U1mA/MAX (V)	IL (@0.75U1mA) (uA)	Save Setting	Actual Voltage
	0	0	0.0	Save Setting	0
record the th data	Item	Positive UAE	Negative UEA	Result	Run/Stop
Result	U1mA (V)	0	0		Stop
	IL (uA)	0.0	0.0		Set sub-file
save continue					Back

Remind: U disk storage file name: KV1101M CSV.

- Set Parameters (Qualified Range)

Name	Description
Set Min Value	Touch “Mini(V)” and set the value between 60 and 1800 in the pop up soft keyboard.
Set Max Value	Touch “Maxi(V)” and set the value between 60 and 1800 in the pop up soft keyboard.
Save Setting	Select “Save Setting” after setting done, then confirm and save the values. The values are memorized to the Tester.

- Scalar Qualified Range Setting

Select “Set Grading” in the Single MOV Module menu to enter Discharge Tube Voltage Range Automatic Grading menu, 4 kinds of qualified condition supported, shown as below:

Auto-step of MOV voltage range

Step code	Lower Limit	upper Limit
A BOX (OK1)	Auto -qualified minimum	0
B Box (OK2)	Auto-limit Value to A box	0
C Box (OK3)	Auto-limit Value to B box	0
D Box (OK4)	Auto-limit Value to C box	Auto -qualified maximum
E Box (NO OK)	All is less than the minimum and larger than the maximum range.	

Remind: Data logging software use to Statistics and analysis test results.

OK

- Upper Limit Setting Instruction

Upper Limit of A box(qualified 1), B box(qualified 2) and C box(qualified 3) can be set in the MOV Voltage Range Automatic Grading menu.

Name	Description
Upper Limit of A box(qualified 1)	Touch the green number of the A box (qualified 1) and set the value in the pop up soft keyboard, the value should be between the qualified Min Value in Single Discharge Tube Module menu and 1800.
Upper Limit of B box(qualified 2)	Touch the green number of the B box (qualified 2) and set the value in the pop up soft keyboard, the value should be between Upper Limit of A box (qualified 1) and 1800.
Upper Limit of C box(qualified 3)	Touch the green number of the C box (qualified 3) and set the value in the pop up soft keyboard, the value should be between Upper Limit of B box (qualified 2) and 1800.
Confirm	Select "Save Setting" after setting done, the tester will memory the values and return to Single Discharge Tube Module menu.

Single Varistor Module Test Instructions

Single MOV Module

Save Set-state After Setting A 

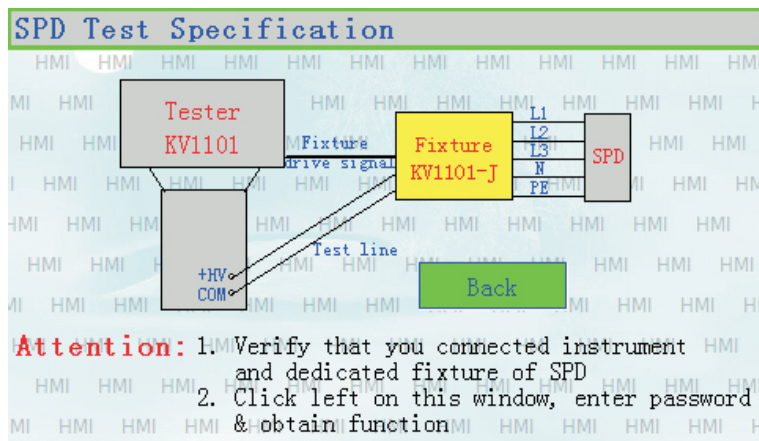
Set Par (Range)	U1mA/MIN (V)	U1mA/MAX (V)	IL (@0.75U1mA) (uA)	Save Setting	Actual Voltage
	0	0	0.0	Save Setting	0
record the th data	Item	Positive UAE	Negative UEA	Result	Run/Stop
Result	U1mA (V)	0	0		Stop
save continue	IL (uA)	0.0	0.0		Set sub-file
					Back

Remind:U disk storage file name: KV1101M CSV.

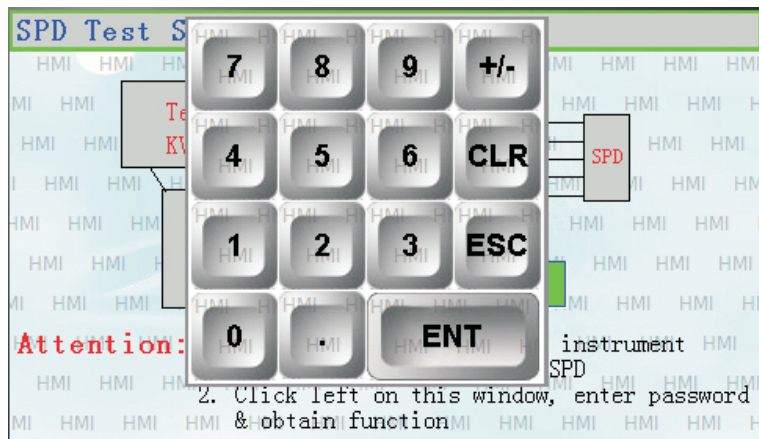
- Make sure to return to "Single MOV Module" menu, insert 4GB USB Disk to the USB interface.
- Insert the crocodile clip probes to the test ports, clip the MOV using crocodile clip or probe.
- Press the green START of the Tester to start test. Test parameters and judgment results will be displayed on the screen when test done.
- When finishing test a batch of products, please pull out the USB Disk after the Tester power off, otherwise the storage data may be lost
- The .csv format file named "KV1101M.csv" is automatically generated in the USB Disk, it can be opened by both Excel and WPS.
- Touch "Return" in the left bottom of the screen to return main menu (Test Select Menu) when finishing test.

Multi SPD Modules (M-SPD)

Select “Multi SPD Modules (M-SPD)” in the “Test Select Menu” to enter SPD test instruction menu, shown as below:



Please contact us on demand to get the password. According to the indication, touch the left bottom of the screen to pop up the soft keyboard, shown as below:



Use this function after enter password.

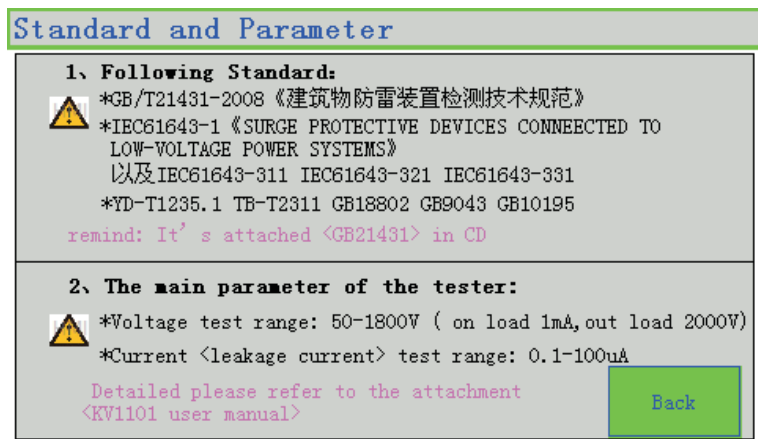
Contact Us

Select "Contact Us" in the "Test Select Menu" to enter Contact Us menu, shown as below:



SPD Test Standard
GB21431-2008

Select "SPD Test Standard (GB21431-2008)" in the "Test Select Menu" to enter Standard and Parameters menu, shown as below:



Tester Check and Calibration (Voltage and Current)

Select “Tester Check and Calibration (Voltage and Current)” in the “Test Select Menu” to enter Check and Calibration Menu and operation instruction menu, shown as below:

Calibration Function

Remind: Press <output report> button when third step finished, data will be output to the U disk \KV1101T.CSV

Start

First → click< start calibration> button save

Check Voltage

Second →

1. output voltage is 600 VDC at present
2. Using a standard voltmeter (multimeter) test output voltage if consistent with the tester voltage
3. allowable error $\pm 2\%$

Check Current

Third →

1. Current calibration according to ohm's law
2. Take the standard 10 M Ω resistor connects to output port of tester. Use voltage divided by 10 M Ω is current
3. allowable error $\pm 2\%$
4. Testing voltage will drop as the load changes.

Record

Fourth → The fourth step other < rising slope> <0.75UImA> use oscilloscope

Start

Stop

Voltage

0 V

Current

0.0 uA

Finish

Finish

3-3. Operating Introduction for Transfer Software

We have developed a data record software based on serial port communication for Lightning Protection Components Field Tester. The software is synchronized with the data of the Tester, and also able to save the data automatically.

Install the software for the first time use:

- ◆ Click setup.exe to install the data transfer system automatically, please restart the PC after installation.
- ◆ Click the short cut on the desktop.



3. Main Menu

4. Configure PC

- ◆ Insert serial port or USB- serial port cable to the PC, shown as below:



Serial Port

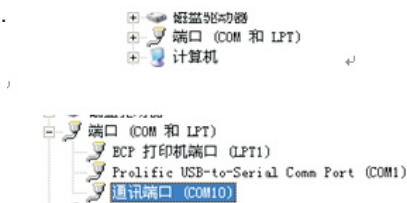


USB-RS232 Cable

◆Connect the Tester and PC with serial port cable.

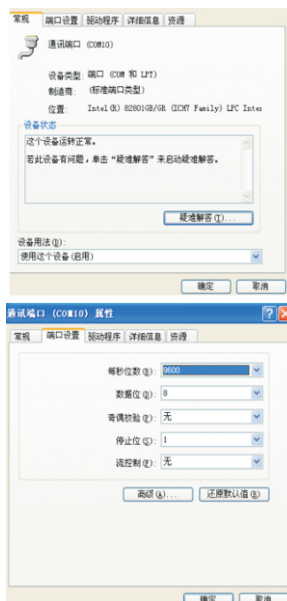
◆Configure COM name

Right click “My Computer”, click “Management”, “Device Manager” and “Port” step by step.



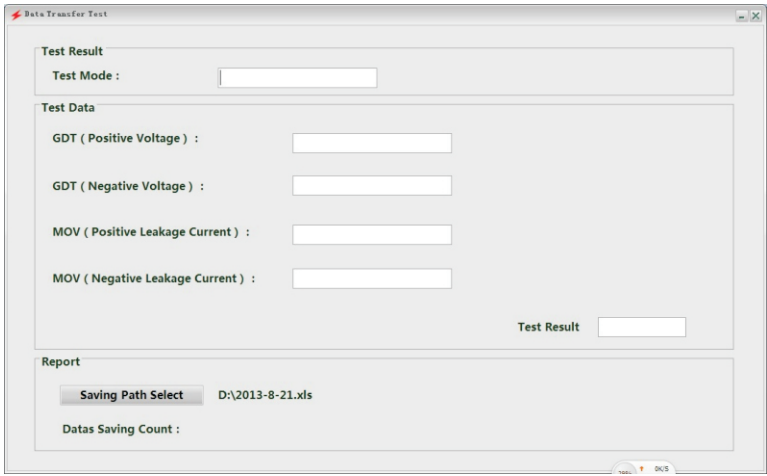
If the communication port is not COM1, please change it to COM1.

Method: Right click “Communication Port”, click “Property”, “Ports Setting” and “Advanced” step by step, select “COM1” in the Drop-Down List and confirm.





Open the software when finishing configuration.



Press the START button on the Tester, the Tester will transfer the test data to the default path of the PC, the menu shows the data of the Tester.

You can click the “auto save path select” button to save this group of data to the specified path. This group of data is saved in the relative cells.

Test Report							
No.	Test Time	Mode	Judgment	GDT or MOV			
				Voltage		Leakage Current	
				GDT (+V) / MOV (+V1mA)	GDT (-V) / MOV (-V1mA)	MOV / +IL	MOV / -IL

4 Tester Calibration Instructions

4-1. Calibration Instructions

Select “Tester Check and Calibration (Voltage and Current)” in the Test Select Menu to pop up “Tester Check and Calibration” menu, shown as below:

a、Voltage Check

- ◆ Shift the multimeter to “1000V” DC mode, insert the red and black probe to the relative red and black output ports. (Make sure the insertion is correct.)
- ◆ Select Check and Calibration Menu to start check, the Tester outputs a fixed voltage (between 530V and 600V) and the value is display on the screen. At the mean time, the multimeter shows the test value.
- ◆ Compare the screen display value and multimeter test value, if error is within 2% the tester is qualified.
- ◆ Select Finish Check to exit check, the tester return to Test Select Menu automatically.



b、Current Check

- ◆ Make sure the screen return to Check and Calibration Menu, insert the 4GB USB Disk to the Tester.
- ◆ Insert crocodile clip probes to the red and black output ports, add a 10M resistor between the probes. (10M resistor on the Standard Module)
- ◆ Select Start Check, check the voltage and current value on the screen, compare current display value and 10th of the voltage display menu, if the error is within 2% the tester is qualified.
- ◆ Select “Output Report”, the CSV file named by KV1101T will be automatically generated in the USB Disk. Open the file by Excel or WPS.
- ◆ Select Finish Check to exit check, the tester return to Test Select Menu automatically. (Attention: select Finish Check after check finished, otherwise the Tester will continuously output high voltage)



5 USB Storage

USB Disk Storage

USB Disk Storage Data function is available in the Field Mode, Single Discharge Tube, Single MOV Module, Check Mode and Building Lightning Protect function modules for KV1101, and generate “.csv” file. The file can be opened by Excel or WPS.\

1、Field Mode

Start test after inserting USB Disk, a “.csv” file named by the date such as “20130703.csv” is generated in the USB Disk in this mode. The file can be opened by Excel or WPS. The generated cells are shown as below:

Voltage	Leakage Current	Judgment	Date	Time
416	0.2	1	2013-6-28	18:48:53
418	0.2	1	2013-6-28	18:49:01
419	0.2	1	2013-6-28	18:50:25
419	0.3	1	2013-6-28	18:50:37
418	0.2	1	2013-6-28	19:00:03
416	0.2	1	2013-6-28	19:00:07

2、Single Discharge Tube

Start test after inserting USB Disk, a “.csv” file named by KV1101G such as “KV1101G.csv” is generated in the USB Disk in this mode. The file can be opened by Excel or WPS. The generated forms are shown as below:

Breakdown Voltage+	Breakdown Voltage-	Judgment	Date	Time
526	513	2	2013-8-9	10:31:55
522	514	1	2013-8-9	10:32:23
527	513	1	2013-8-9	10:35:17
537	515	1	2013-8-9	10:41:10
1200	1196	2	2013-8-9	10:49:22
368	368	2	2013-8-9	10:49:44
553	553	1	2013-8-9	10:50:00

3、Single MOV Module

Start test after inserting USB Disk, a “.csv” file named by KV1101M such as “KV1101M.csv” is generated in the USB Disk in this mode. The file can be opened by Excel or WPS. The generated cells are shown as below:

Voltage+	Voltage-	Leakage Current+	Leakage Current-	Judgment	Date	Time
1240	1240	0.1	0.1	1	2013-8-9	10:42:55
1247	1241	0.1	0.1	1	2013-8-9	10:45:12
1238	1235	0.2	0.3	1	2013-8-9	10:46:28
1246	1240	0.1	0.2	1	2013-8-9	10:48:19
1248	1242	0.3	0.1	1	2013-8-9	10:52:38
1235	1241	0.3	0.2	1	2013-8-9	10:59:26

4、Check Mode

Start test after inserting USB Disk, a “.csv” file named by KV1101T such as “KV1101T.csv” is generated in the USB Disk in this mode. The file can be opened by Excel or WPS. The generated cells are shown as below:

Voltage	Current	Date	Time
564	57.4	2013-7-4	18:22:10
589	59.2	2013-7-8	11:15:28
558	55.3	2013-7-9	13:28:45
564	55.9	2013-7-9	17:19:10
595	59.2	2013-7-10	11:29:48
560	55.8	2013-7-10	14:28:42

5、Building Lightning Protect

Start test after inserting USB Disk, a “.csv” file named by the date such as “20130703C.csv” is generated in the USB Disk in this mode. The file can be opened by Excel or WPS. The generated forms are shown as below:

Lightning Protection Level	Shield	1.R=	2.h=	3.S=	3.dv=	3.dv=	3.ω=	3.r	Date	Time
200	2	0	0	0	55	0	0	0	2013-7-8	11:14:25
200	2	0	0	0	55	0	0	0	2013-7-8	11:14:48
200	2	0	0	0	55	0	0	0	2013-7-8	11:14:56
200	2	0	0	0	55	0	0	0	2013-7-8	11:15:15
200	2	0	0	0	55	0	0	0	2013-7-8	11:15:28

•6、Attention:

- ◆ USB Disk with capacity more than 8GB is forbidden to insert USB port.
- ◆ PC or mobile HDD is forbidden to be connected to USB port.
- ◆ The indicator of USB Disk flashes when storage done.
- ◆ When finishing test, please pull out the USB Disk after the Tester power off, otherwise the storage data may be lost.

6 Test Fixture

6-1. Test Fixture

▪Fixture Introduction

- ◆ This function is customized, extra cost is necessary.
- ◆ The fixture uses external power supply, connect the control cable, connect tester output ports to the fixture input ports. Connect fixture output ports to SPD, press START to finish M-SPD module test.
- ◆ Additional introduction: the tester is available for M-SPD test, please read FAQ for reference. One SPD module for once test, operation done after M times test.



7 Working Environment

- Working power supply: battery inside, fit for AC220V/110V
- Environment Temperature: -10~40℃
- Environment Humidify: $\leq 85\%$
- Withstand Voltage: AC1.5KV 50Hz 1min

8 Maintenance Manual

8-1. Tester Accessories

Accessory Type	Name	Description
Standard Configuration	KV1101	0. 1-100 μ A/1-1000 μ A (custom)
	Test Probe(2 pairs)	Connect test components
	USB Disk	Storage test result with cells
	AC Adaptor	Charge the battery or as extern power supply
Standard Configuration	Standard Module	For check and calibration
	CD	Test Software/User's Manual/Operation Video/Chinese Standard
	Holder	Place tester
	Braces	For portable carry
	Serial Port cable	Connect PC and tester, transfer test data
	Verification Certificate	
	Certification	
	Color Page	Introduce test parameters and features
	User's Manual	Guide user to operate the tester
Custom Item	M-SPD test fixture	Support fast test M-SPD (extra cost)

8-2. Trouble Shooting

If problem occurs when you use KV1101 Lightning Protection Components Field Tester, please solve the problem according to the following form. If the problem remains, please contact us.

Symptom	Analysis	Method
The tester halts when using battery	Improper operation: the Enable Battery button held	Only press the Enable Battery button, not hold
The tester works abnormally when tests.	Improper operation: the START button held	Set proper range, read the Operating Introduction section for reference Only press the START Button, no hold
Test value always "Not Qualified"	Improper qualified range set.	
Can't power on the test. The indicator turns read when press Battery Check button.	Low battery	Charge the battery
The screen black out after 2 to 3 minutes	Standby function, to save the energy of battery	Touch any position of the touch screen to wake up the tester
The screen black out during Check Mode	Large current generated during test	Connect external power supply

◆ Maintain Method

- 1、Clean the tester with alcohol monthly.
- 2、Power off the tester when no tests.
- 3、Put the tester to the aluminum box in the dry, shady position when not use the tester for a long time

8-3. FAQ

Q&A:

1. Can the power on M-SPD module be tested with KV1101?

A: No. KV1101 is only for power off Lightning Protection Components Test (GDT MOV and M-SPD), not power on. Because there is a voltage between the 2 ports of the power on M-SPD module and so is the KV1101, if the M-SPD module and KV1101 are connected directly, accident occurs. The tester will be burned out, and the power supply circuit that M-SPD protects may be burned out too.

2. Can M-SPD module be tested without test fixture with KV1101?

A: Yes, but only one sub module for one test. Here are two test methods:

①. In SPD Field Test (Meteorology) mode, take apart the sub modules from the M-SPD, clip the sub module with crocodile clip probes, test them one by one.

②. In SPD Field Test (Meteorology) mode, connect the M-SPD short out port and other port of the M-SPD module with pointer probes, test the sub modules one by one.

3. Is the test fixture contained in the Standard Configuration? If not, free or not?

A: Not contained in the Standard Configuration, it is customized. It's not free.

4. Can the Enable Battery button be held for a long time after KV1101 power on?

A: No. The Enable Battery button is only used to activate the battery circuit when the tester uses the battery supply, release the button after the tester power on. Otherwise, the tester may halt or occur other problems.

5. If KV1101 continuously works for a long time (4 hours), will the battery inside explode?

A: The battery becomes heated when the tester continuously works, but won't explode.

KV1101 uses polymer battery. When the tester overloads, the battery may be declared worthless, but won't explode.

6. Can KV1101 be used in thunderstorm day outdoors?

A: No. KV1101 is not moisture proof, operation in this condition will cause danger to the operators.

7. Can KV1101 store data? How does it work?

A: Yes, via USB Disk. The files generated in the USB Disk can be opened by Excel and WPS.

8、Can KV1101 transfer real time data to PC?

A: Yes. Install the specified software we developed, connect the tester and PC via serial port cable, the test data can be transferred to PC and generate the forms.

9、Can KV1101 be connected to the PC via USB cable?

A: No. USB port of KV1101 is only for USB Disk, its connection to PC will cause short out and burn out the tester or the PC.

10.Can USB Disk pulled out when power on?

A: No.

The correct operation of USB Disk is shown as below: insert the USB Disk when entering Test Menu after power on (caution: insertion during test is forbidden); pull out the USB Disk after power off. Otherwise, it may cause the stored data in chaos, even damage the USB Disk.

11、How much the capacity of USB Disk can be supported by KV1101?

A: KV1101 Standard Configuration USB Disk is with capacity of 4GB, it can support 32GB on maximum, but don't support mobile HDD. But the data storage becomes not stable when the capacity of USB Disk goes up. Standard Configuration USB Disk is recommended.

12.How many sub types do KV1101 have? What's the difference among them?

A: KV1101 has 3 versions: KV1101A, KV1101B and KV1101C.

KV1101A is mainly used for the Lightning Protection Components manufacture, KV1101B for Lightning Protection Components dealer and KV1101C for Meteorology, Operator and Engineering Company.

13.Are there some standards for KV1101?

A: KV1101 has following reference stand:

- ①GB21431-2008 <Technical specifications for inspection of lightning protection system in building>
- ②IEC61643.311 Specification for gas discharge tubes (GDT)
- ③IEC61643.331 Specification for metal oxide varistors(MOV)
- ④IEC61643.321, IEC61643.341 and so on.

14.Which fields is KV1101 used in?

A:KV1101 is mainly used in following fields:

- ① Lightning Protection Components (MOV, GDT and SPD module) manufacture.
- ② Operator (Meteorology, Electricity, Communication, Railway, Petrification and Public Security).
- ③Lightning Protection Components(MOV, GDT and SPD module) dealer, agent and Lightning Protection Project Construction Organization.

15.Are there other passwords beside “1111” for KV1101?

A:Yes, there are.

The functions based on “1111” are used to meet general customers' demands. Other passwords support advanced functions, please contact us for details.

16.Can you introduce the After-Sales Service of KV1101?

A:The warranty period of KV1101 is 1 year, maintain period is throughout the tester's life. The customer should bear the cost after warranty period.

17.Does KV1101 have Check and Calibration function? How to operate?

A:Yes, it has.

Please read Check and Calibration Instructions or Check and Calibration Operation Manual for detail.

18.Does KV1101 have stand-by function?

A:KV1101 will go to stand-by status when no operation lasts 3 minutes. The screen black out, press any position of the touch screen to wake up the tester.

19.What are the regular working voltage and current range for KV1101?

A:Regular output voltage range: 60V-1800V.

Current range: 0.1 μ A-1000 μ A.

20.What are the advantages of KV1101 compared with other products on the market?

A:

1. Operate Simply. One Key Test.
- 2.Touch Screen Operation Interface, Convenient for Man-Machine Communication
- 3.Compatible for GDT and MOV Test.
- 4.Support Intelligent Judgment of Black Box Components for GDT and MOV Test.
- 5.Portable and Support inside Battery for User Operation with endurance for 6 hours with.
- 6.Support Self-Check and Self-Calibration Function with Multimeter.

9 After-Sales Service

One year free warranty service is provided since Lightning Protection Components Field Tester (KV1101) purchased, warranty date starts from the date of purchase invoice of the product. Under normal use, non-human damage, buyers can bring the warranty card and invoice for the repair service.

Have one of the following conditions; do not belong to the free warranty coverage

- The fault caused by operation not according to the instructions on the requirements of the User's Manual.
- The fault caused by artificial drop or impact.
- The fault caused by unauthorized breaking down or installation.
- The fault caused by accident, misoperation, try out or intentional damage.
- Out of warranty period

KOVI TEST has the right to modify the tester without notification. All content of this manual have been carefully checked, KOVI TEST reserves the right of final interpretation for printing error or the misunderstanding of the contents.

Customer Feedback

Thank you for your use of KOVI products, only sincerely to thanks! In order to provide more timely repair, consulting and other service for you, help you to encounter problems in the process of using, please fill out the feedback receipt and send it to our company, to establish user service files.

10 Accessories

Item	1PCS	Confirmation
10-1.power cable	1PCS	
10-2.AC adaptor	1PCS	
10-3 Holder	1PCS	
10-4 4GB USB Disk	1PCS	
10-5 CD	1PCS	
10-6 Braces	1PCS	
10-7 Serial Port Cable	1PCS	
10-8 Test Probe	2PAIRS	
10-9 Verification Certificate	1PCS	
10-10 Certification	1PCS	
10-11 Color Page	1PCS	
10-12 Standard Module	1PCS	
10-13 User's Manual	1PCS	
10-14 M-SPD test fixture	1PCS	
10-15 Maintenance Manual	1PCS	
10-16、Customer Feedback Card	1PCS	

KOVI TEST Productions Warranty Card

Production Name: _____

Production Type: _____

Date of Production:_____

Production S/N:_____

Purchase Date:_____

Purchaser Name:_____

Address: _____

Telephone:_____

Agent Name: _____

Address: _____

Tel:_____

KOVI TEST Productions Feedback Card

Production Name: _____

Production Type: _____

Date of Production: _____

Production S/N _____

Purchase Date: _____

Purchaser Name: _____

Address: _____

Tel: _____

Agent Name: _____

Address: _____

Telephone: _____

Customer Comments

Customer Signature: _____

Please fill in the card when purchasing KV1101, send the card with agent's seal to KOVI TEST Customer Service Department in 30 days. KOVI TEST will establish user service files and offer track service for you.



Please send the Feedback Card to KOVI TEST on following address:

Address: 4th 4/F. Bld. No.4, Block No.2, South Honghualing Industrial Zone,
Xili, Nanshan District, Shenzhen

E-mail: kovi@kovitest.com

Customer Comments

Maintenance Date			
Maintenance Condition			
Responsible Person			
Maintenance Date			
Maintenance Condition			
Responsible Person			



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